

TO WHOM IT MAY CONCERN:

BE IT KNOW THAT I, JOHN P. HELY, a citizen of
the United States of America, residing in Oxnard, in the
5 County of Ventura, State of California, have invented a
new and useful improvement in

10 SELF TIGHTENING, ANKLE BRACE

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BACKGROUND OF THE INVENTION

5 This invention relates generally to ankle braces, and more particularly to improvements in such braces enabling ease and rapidity of application to the wearer's ankle, as well as continued and enhanced ankle stability, due to brace self-tightening.

10 Injuries to ankles such as sprains frequently require the application of ankle braces, which must be repeatedly applied and removed at frequent intervals. Accordingly, ease and rapidity of application and removal are essential. There is need for improvements in ankle braces enabling such ease and rapidity of brace application and removal, as well as providing for
15 enhanced and/or continued ankle stability, when applied.

SUMMARY OF THE INVENTION

20 It is a major object of the invention to provide an improved ankle brace meeting the above need. Basically, the ankle brace apparatus embodying the invention comprises:

a) strap structure including first and second elongated strap portions, said structure defining a through slit,

b) said first portion adapted to be wrapped about an ankle,

c) said second portion adapted to extend through the slit, then downwardly at one side of the ankle, then underfoot, and then upwardly at the opposite side of the ankle, for operative attachment to said first portion.

As will appear, stabilized and simplified support at ankle opposite sides with self adjustment, an important, along with provision of a unitary strap configuration. As will be seen, the unitary strap incorporate said first and second portions, the second portion foldable relative to the first portion, and proximate the slit that accommodates self adjustment. The slit typically extends at angle α relative to the strap first portion direction of elongation, where

$$40^\circ < \alpha < 50^\circ.$$

A further object of the invention is to provide an adjustable hook and pile interconnection that

defines the attachment between the strap first and second portions.

The method of establishing the brace in operation position includes the steps

5 a) and providing strap structure including first and second elongated strap portions, said structure defining a through slit,

10 b) wrapping the strap first portion about the lower leg above the malleolus, and passing the strap second portion through the slit, and to extend downwardly at the ankle side.

15 As will be seen, the strap second portion is allowed to self adjustingly slide endwise in said slit, in response to ankle flexing, assisting tightening of strap structure.

20 Another step of the method may be considered to include folding of the strap structure to direct the strap downwardly through an angled slit that extends at an angle α relative to the strap first portion direction of elongation, where

$$40^{\circ} < \alpha < 50^{\circ}.$$

These and other objects and advantages of the

invention, as well as the details of an illustrative embodiment, will be more fully understood from the following specification and drawings, in which:

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DRAWING DESCRIPTION

Fig. 1 is a right side elevation showing a preferred strap, applied to an ankle region of a right foot;

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Fig. 2 is a left side elevation of the strap seen in Fig. 1;

Fig. 3 is a right side perspective view showing the Fig. 1 strap in partially applied position;

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Fig. 4 is a frontal view showing the Fig. 1 strap in partially applied position;

Fig. 5 is a plan view of the Fig. 1 strap showing its outer side, in flattened position; and

Fig. 6 is like Fig. 1, but showing a mirror image strap applied to the wearer's left foot.

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DETAILED DESCRIPTION

In the drawings, the brace 10 includes an elongated strap structure 11 having first 11a and second

11b strap portions. First portion 11a is configured to wrap about the lower leg 12, just above the protruding malleolus region 12a, which blocks the wrap from shifting downwardly. See in Fig. 3 lower edge beading 11aa of the strap first portion retained just above the protrusion 12a at the user's right ankle. The wrapped first portion 11a is initially fixed in position by an attachment means, one example being hook and pile (VELCRO) elements shown at 13 on the outer side of 11a, and at 14 on the inner side of a tab or flap 15 attached at 15b to the end of 11a.

The strap portion 11a also has, or defines, an associated "re-direction means", as for example an angled slit or slot 16 extending through 11a near its end 11a', to which flap 15 is attached.

Stiffener means may be provided proximate the inner side of 11a, proximate slit 16, to stiffen the re-directing function of the slit i.e. re-directing of the strap second portion 11b to extend downwardly through the slit, and as accommodated by down folding at 11b' of the strap 11, after passing through the slit. See Fig. 2.

Lengthwise elongated cushioned areas 17, extend at opposite sides of the concealed elongated

stiffeners 20. The stiffeners which may be defined by thin metallic members, extend generally diagonally and parallel to the slit, at angle β relative to the length direction 22 of the strap, where β is between 30° and 60° , and preferably about 45° .

Figs. 1 and 2 show the strap portion 11b extending downwardly at 11bb at one side of the ankle (preferably the inner side); then extending under the foot 23, at 11cc; and then extending upwardly at 11dd at the outer side of the foot, for easy attachment to strap portion 11a. The strap extent 11dd may cover the malleolus, when pulled up into affixing position defined by adjusted hook and pile elements as at 15b and 26 on the two strap portions 11a and 11b. The latter may be used to easily and adjustably attach the strap portion 11dd to the wrap, allowing self-adjusting or self tightening of the brace, as also accommodated by adjusting of the folded strap portion 11b' at the slit. Removal of the brace is quick, as enabled by pulling 11dd free from the wrap.

The method of strap use include:

a) strap structure including first and second elongated strap portion, said structure

defining through slit,

b) said first portion adapted to for wrapped about an ankle,

5 c) said second portion adapted to extend through the slit, then downwardly at one side of the ankle, then underfoot, and then upwardly at the opposite side of the ankle, for operative attachment to said first portion.

10 The method also include allowing the strap second portion to self adjustingly slide endwise in the slit, in response to ankle flexing, assisting tightening of the strap structure; and folding of the strap structure to cause the strap second portion to extend downwardly through the slit.